

UNLOCKING MEANS FOR SIDEWALLS OF RIGID FOLDABLE OR COLLAPSIBLE BOXES

BACKGROUND OF THE INVENTION

5 1. Field of the Invention.

This invention refers to unlocking means for sidewalls of rigid boxes of the foldable or removable wall type. The invention can be especially applied to reusable packing boxes for fruit export.

2. Description of the Related Art.

10 In the field of boxes for the export of fruit or similar, a great number of boxes available is required at the packing stations, thus the use of boxes taking up a reduced storage space being advantageous, while they are in the stage prior to filling. Said boxes must be assembled in a fast and safe way.

15 There is a wide range of rigid or semi-rigid foldable or collapsible boxes for the transport of such products as fruits or similar for export and which are provided with locking arrangements allowing the joining of adjacent sidewalls in the rigid position of an assembled box.

20 One of these solutions is disclosed in U.S. Pat. N° 5,853,099 by Claude Lessard, where a five-piece open container with locking arrangement is shown, which is made up by a rectangular bottom piece and four side pieces (14, 16; 18, 20), with the upper portion of the side edge of these side pieces having built-in cooperating means in order to interengage the adjacent side pieces (14, 18) in an erect position. The interengaging means showing Lessard's locking arrangements are made up by flexible, finger actuatable means (36).

Figures 1A-1C of this patent application show the sequence of action to be followed in order to unlock the sidewalls of a container by hand according to Lessard invention. These Figs. 1A-1C are based on Figs. 3C-3A of U.S. Pat. N° 5,853,099 and their original number references are kept. In order to start the unlocking of the end piece (18), pressure should be exerted with one finger on the means (36) following the direction of the arrow (68), while with another finger the end piece (14) is pushed following the direction of the arrow (66'), as shown in Fig 1A, so that the projecting part (30) of the end piece may slide along the inner surface (up in the figure) of the projecting part (38) of the finger actuable means (36). In this condition, the means (36) and their projection (38) are elastically bent, becoming loaded with a restitution force which will "trigger" the end piece (14) as soon as the finger that is exerting pressure in the direction of the arrow (68) starts to stop its action, thus producing a painful impact on such finger by the projecting part 30 of the end piece (14). This impact on the fingers of the person handling the containers is not negligible, if we consider that at the packing/unpacking centers, a person should disassemble hundreds of containers during a work shift and due to the narrow access zone to actuate the locking arrangements, these persons may not wear protecting gloves, since these would prevent the performance out of the containers' unlocking operation.

This invention, on the contrary, adds an additional unlocking function, so that those state-of-the-art boxes that usually are unlocked applying pressure with the fingers from inside towards outside of the box, now can be released pulling them from outside of the box. This has several advantages, such as the elimination of the commented "trigger" effect on the operator fingers; and to avoid contamination on the interior of the box, due to manipulation, when high hygienic standards are required.

BRIEF DESCRIPTION OF DRAWINGS

The locking means for rigid boxes sidewalls of this invention will be described in further detail by the support of drawings which have an illustrative but not restricted nature, where:

5 — **Fig. 1A, Fig. 1B and Fig. 1C** show locking means of the state of the art as those disclosed in U.S. Pat. N° 5,835,099;

- **Fig. 2** shows a perspective view of a rigid box in an assembled condition and provided with the unlocking means of this invention;

10 - **Fig. 3** shows an enlarged fragmentary perspective of the rear upper corner of the box of Fig. 2, viewed from inside, with its adjacent sidewalls in a condition prior to the locking condition of its sidewalls;

Fig. 4 shows the enlarged fragmentary zone of Fig 3, viewed from outside of the box and in the same condition prior to the locking condition of its sidewalls;

15 - **Fig. 5A** is a cross-sectional view of the corner of the box shown by Fig. 3 and Fig 4, according to a plane which is parallel to the box bottom, that crosses through the unlocking means, in a condition prior to the unlocking of its sidewalls;

— **Fig. 5B** is a cross-sectional view of the corner of the box shown by Fig. 3 and Fig 4, according to a plane which is parallel to the box bottom, that crosses through the unlocking means, in a final condition to the unlocking of its sidewalls;

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DETAILED DESCRIPTION OF THE INVENTION

In the **Figs. 2 to 5B** there is shown a preferred embodiment of the invention, which is described in detail. Nevertheless, the variant of the some embodiments which result as inversions on the symmetry according to certain planes of symmetry, must be considered as

equivalent. For example, the invention applied to a rigid box 1 made up by a bottom wall 2, two head walls 4 and two main sidewalls 6, in where the head walls 4 count with locking means as well as the unlocking means, and main sidewalls 6 count with complementary locking means, as will be described hereinafter; being obvious that the locking means and the unlocking means could be located in the main sidewalls 6 and, consequently, the complementary locking means must be located in the head walls 4.

As shown in Fig. 2 the rigid box 1 is made up by a bottom wall 2, two head walls 4 opposing each other and two main sidewalls 6 opposing each other and respectively perpendicular to the head walls 4. The head walls 4 and the main sidewalls 6 may be independent of the bottom wall 2 or they may form part a set with it, provided that the zone of its lower edges is flexible, thus defining hinge areas between the head walls 4 and the bottom wall 2 and between the main sidewalls 6 and the bottom wall 2. In the event that the head walls 4 and the main sidewalls 6 are independent from the bottom wall 2 of box 1, the edges of the bottom wall 2 and the lower edges of the head walls 4 and the lower edges of sidewalls 6 are provided with supplementary hinge means in order to allow the pivoting assembly of sidewalls (4, 6) in relation to the bottom wall 2, so that the sidewalls (4, 6) are perpendicular to the bottom wall 2 when the box is already assembled by the locking of these sidewalls (4, 6).

In Fig. 3 through Fig. 5B the unlocking means of sidewalls of this invention can be appreciated with further detail. The locking means as well as the unlocking means are located in the upper area side edges of sidewalls (4,6). The locking means consist in sliding fastening elements or front release buckles [*fastener or front release buckle*], where the upper zone of the side edges of the head walls 4 have the corresponding projection of

fastener 10, which main planes are parallel to the plane of the head wall 4. The upper zones of the side edges of main sidewalls 6 have corresponding lock portions 12 in which the corresponding projections of fastener 10 actuate; being the lock portions 12 oriented in order to allow the entrance of the corresponding projection of fastener 10 according to a relative displacement which is parallel to the plane of corresponding main side wall 6.

Each projection of fastener 10 is made up by a wedge portion 17 with one of its main faces oriented in a substantially parallel way to the plane of the head wall 4; being the inclined face of the wedge portion 17 placed so that its narrower zone is further away from the vertical edge end of said head wall 4, whereas its wider zone is nearer to this vertical edge of the head wall 4; defining said wider zone of the wedge portion 17 an operating side 19. The wedge portion 17 is joined to the head wall 4 through its narrower zone, being the remaining of the wedge portion 17 left in cantilever (projection); where the junction zone allows wedge portion to pivot elastically.

Hereafter, unless otherwise specified, when the terms "external", "internal", "upper" and "lower" or its equivalent "outwards", "inwards", "above" (or "over") and "below" they are referred to the sidewalls (4,6) and must be understood in relation to the box that they will form. Thus "outwards" indicates a normal direction (or perpendicular orientation) respect to the plane of the wall projecting outwards of the box. Correspondingly "above" indicates a normal direction of the base of the box that projects upwards of this one.

The external main face of the wedge portion 17 has a projection for finger pull 13, which extends in an outward direction from the main plane of the head wall 4 which, preferably, does not outstand this head wall. The projection for finger pull 13 may consist on a curved wall, defining a pocket between it and the external main face of the wedge

portion 17, so that a finger can be introduced to pull the projection of fastener 10, as it is shown in the figures. Alternatively, the projection for finger pull 13 may consist of a portion of wall, tab or pin, substantially normal (or perpendicular) to the main plane of the head wall 4, that allows to grasp it with two fingers to pull it.

5 The lateral ends of each head wall 4 finish in corresponding portions of end wall 25, oriented perpendicularly to the main plane of this head wall 4, so that the longitudinal section of the lateral ends of the head wall has an "L" shape. These portions of end wall 25 are located, at least, in an area that extends a bit below and up to over the area where the wedge portion 17 is located, as it is shown in Fig. 3. In each portion of end wall 25, over
10 and below the wedge portion 17, are corresponding protrusions 20, which are projected in an inwards direction respect to the main plane of main side wall 6 (considering it already attached to the head wall 4). Despite the above, these protrusions 20 that arise from the portion of end wall 25 are distanced from the main internal surface of the head wall 4 so that in the space there formed can be housed an end lip portion 14 of main side wall 6, as it
15 will be described after.

Each lock portion 12 of main sidewall 6 is formed by two types of elements adjacent to each other according to a substantially parallel direction to the lateral edge of main side wall 6: an end lip portion 14; and two portions of housing box 15. The end lip portion 14 is formed like a narrowing of the lateral edge of lateral main side wall 6, in the
20 zone that will face the operating side 19 of the wedge portion 17, in the projection of fastener 10 of the head wall. Each portion of housing box 15 defines a cavity outwards main sidewall 6.

When box 1 is assembled with its sidewalls (4,6) locked to each other, as it is in the Fig. 5A, the portion of housing box 15 of main sidewall 6 is fitted in a corresponding protrusion 20 of the head wall 4. This prevents the undesired displacement of the head wall 4 in a normal direction of its main plane. In this situation, also the end lip portion 14 of main sidewall 6 is retained between the internal wall of the portion of extreme wall 25 of the head wall 4 and operating side 19 of the wedge portion 17. This prevents a displacement of main sidewall 6 in a normal direction of its main plane.

In order to unlock the sidewalls of the box it suffice to pull outwards the projection for finger pull 13 so that the wedge portion 17 pivots elastically around its narrower zone, where it joins with the rest of the wall. In this situation, when pivoting outwards the wedge portion 17, its operating side 19 moves, distancing from the surface of end lip portion 14, now being able to move manually the main side wall 6 inwards so that its portion of housing box 15 is liberated of corresponding protrusion 20 of the head wall 4.